



Contribution ID: 21

Type: **Contributed talk**

GPE Calculations for Superfluid Neutron Quantum Vortices and Superconducting Proton Fluxtubes in Neutron Stars

Wednesday, January 29, 2025 4:40 PM (25 minutes)

Neutron stars exhibit sudden changes of its rotational velocity, known as “pulsar glitches”. It has been believed that glitches are mainly caused by superfluid neutron vortices in the inner crust of neutron stars. However, importance of contributions of the outer core has been recently discussed, and further microscopic investigations of quantum vortices and flux-tubes in the outer core of neutron stars are highly desired.

In this study, we investigate the interaction between quantum vortices of 3P_2 superfluid neutrons and flux-tubes of 1S_0 superconducting protons in the outer core of neutron stars, based on a successful bosonic theory of superfluid, the Gross-Pitaevskii equation (GPE). In this talk, we will discuss how the 3P_2 superfluid vortices interact with proton flux-tubes under a magnetic field.

Primary author: HATTORI, Tatsuhiro (Institute of Science Tokyo)

Co-author: SEKIZAWA, Kazuyuki (Institute of Science Tokyo)

Presenter: HATTORI, Tatsuhiro (Institute of Science Tokyo)

Session Classification: Oral Presentation